

ON THE LIFE HISTORY OF PIERIS VIRGINIENSIS EDWARDS (LEP., PIERIDÆ)

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The life history of *Pieris virginiensis* Edwards has been incorrectly known or unknown, it is impossible to tell which, ever since Edwards' notes on it in his "Butterflies of North America," (I: 34, pl. 9, 1871). In this work he described the early stages of a generalized and imaginary *Pieris* species, and stated that the description would apply equally well to *oleracea*, *rapæ* or *virginiensis*. From his later paper (*Papilio*, I: 95-98) it is evident that Edwards did not possess at any time authentic specimens of the early stages of *virginiensis*. In the latter paper, discussing it as a Spring form of *oleracea*, an error which has persisted until nearly the present day, he mentions a female taken by Mead in the last week of June at Stony Clove in the Catskill Mountains. From this many eggs were obtained; only one of these was reared to maturity, and from the chrysalis an *oleracea* emerged. At the time of writing this Edwards had a drawing of this chrysalis, and stated that it was exactly the same size and shape as *oleracea*. This is not surprising, as the specimen undoubtedly was *oleracea*. Stony Clove is in excellent territory for *napi* (*oleracea*), but I know of no records of *virginiensis* from there. I have, however, seen undoubted specimens of *virginiensis* from Big Indian Valley in the Catskills, where the environment is more suited to *virginiensis*. *Napi* may be regarded as essentially a Canadian Zone species, *virginiensis* as a Transition Zone one.

Scudder ("Butterflies of New England," 2: 1191-1204) places *virginiensis* as a synonym of the Spring brood of *oleracea*. He figures an *oleracea* chrysalis (*loc. cit.*, Pl. 84, fig. 57, 63, 64) and states that, in comparison with European *napi* the frontal tubercle curves distinctly upward, and that the carinae of the abdomen are more elevated and flared sidewise. I am not able to judge the validity of these statements because of lack of sufficient

material for comparison, but should say that it is my impression that the differences cited are not valid, and that in a series of specimens there will be found no constant differences between the chrysalids of European and American *napi*. This, however, does not affect *virginiensis*, as Scudder appears to have been unacquainted with its early stages. He lists several food plants for *napi* (*oleracea*) but omits *Dentaria*, from which *virginiensis* has now been reared.

In 1931 at the Cornell University McLean Bogs Reservation, near McLean, Tompkins County, New York, I was able to obtain undoubtedly authentic eggs, larvæ and chrysalids of *virginiensis*, through watching females ovipositing on *Dentaria diphylla* Michx., the common Pepper-root or Crinkle-root. This is the only food plant on which the species has been definitely recorded.

The eggs unfortunately hatched and the shells were destroyed before they could be studied. The larva is of the conventional *Pieris* type, dark green and hairy, and is extremely close to or identical with that of *P. rapæ* L. Eggs were deposited between May 12 and May 21. None of the larvæ so obtained were reared to maturity, but others found on the same plants were. Pupa-tion takes place by the middle of June. The pupal stage then under normal conditions lasts until the following May, there being only one brood a year.

Last Spring Mr. Cyril dos Passos of Mendham, N. J., visited the same colony of *virginiensis* at McLean, and obtained a number of eggs from a female, of which five were reared through to the pupal stage. Of these four emerged on Feb. 21, and the fifth, though alive, shows no signs of emerging. The early emergence is no doubt due to the abnormal conditions encountered in captivity, even though Mr. dos Passos kept the chrysalids in a refrigerator during the winter. There can, however, be no room for doubt that *virginiensis* is one-brooded.

The pupa (Fig. 1) is definitely different from those of both *napi* and *rapæ*. A pupa of *napi oleracea* from New Hampshire, obtained through the kindness of Mr. dos Passos, is herewith figured (Fig. 2) for comparison. The *virginiensis* pupa is noticeably more slender, and especially less deep than that of

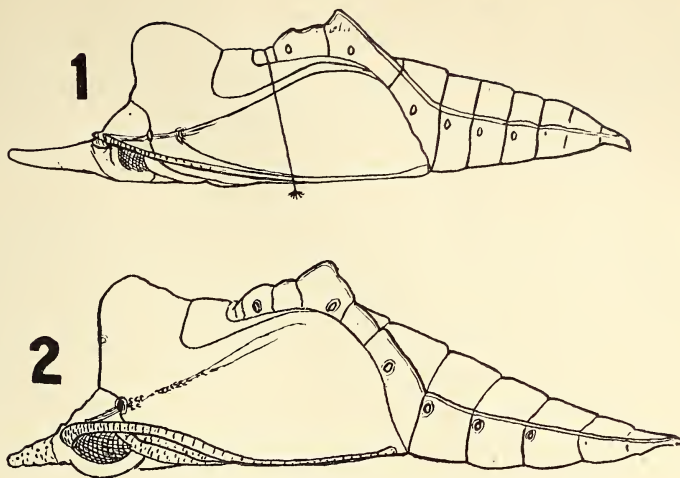


FIGURE 1. Pupa of *Pieris virginiensis* Edwards; reared from larva on *Dentaria diphylla* Michx., McLean, N. Y.

FIGURE 2. Pupa of *Pieris napi oleracea* Edwards, New Hampshire.

The figure of *virginiensis* is from a tracing from a photograph; that of *oleracea* is from a freehand drawing.

oleracea; the frontal process is longer and more slender; the dorsal keel of the first thoracic segment is thinner and more inclined forward; the lateral keels of the anterior abdominal segments have a greater sidewise flare. All of these characters hold for the six *virginiensis* studied. In some, however, the frontal process is shorter than that figured, and in one of the specimens is strongly bent dorsad, as in the *oleracea* figured by Scudder. The pupa is a pale, yellowish green when first formed; it may later change color considerably, some specimens becoming a darker green, others fading to a pale, yellowish white.

As already stated *Dentaria diphylla* is the only food plant recorded for the species. It is possible that it is its only food plant.

The range of environment in which *virginiensis* occurs is very small. In several years' experience with the species at Blainstown, N. J., McLean, N. Y., and Rochester, N. Y., I have never seen individuals in any environment other than rich deciduous woods, where beech and maple are the dominant trees. Even

though sunny fields, rich with flowers and fairly swarming with *Colias philodice* and *Pieris rapæ*, may occur within fifty feet of the haunt of *virginiensis*, I have never seen a single individual stray away from the woods. At McLean a single individual was taken at least a half-mile from the nearest *Dentaria*, but was, true to form, in the woods.

It is probable that this extremely limited environment explains, at least partially, the comparative scarcity of *virginiensis*, especially in this age of reduced forest area. I do not personally take any stock in theories of "competition" and "persecution" by *rapæ*, at least of *virginiensis*. The chosen environments of the two species are too different. I suspect that it has been the disturbance by man of the natural haunts of *virginiensis* that has caused it to become so scarce a species, if indeed it was ever more common. Certainly this species, geographically none too wide-spread, is nowhere found in abundance, even when sought in its chosen environment and at the right time of year. With such a limited range, and occurring in only one brood a year, *virginiensis* may be considered as having a rather precarious tenure of existence. The enormous increase in numbers of parasites, due to the abundance of *rapæ*, may also affect it adversely. *Virginiensis* may well become the first extinct Eastern butterfly.